Curriculum for Dairy Technician
(Certificate Level - 6 months)
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Overall objective of the course

The broader objectives of this course are

- To produce trained work force for dairy sector.
- To maximize the production of international quality milk & milk products for export as well as for local consumption.
- To minimize the milk losses through improvement in industry wide practices.
- To reduce pollution through proper waste management.
- To enhance the quality of milk by controlling adulteration at reception points.

Competencies gained after completion of the course

After completion of this course, the trainee must be able to perform

- Receiving and handling the milk.
- Quality control tests/lab tests/adulteration tests.
- CIP of tanks and utensils.
- Milk / milk products processing.
- Packaging & preservation.
- By-products processing.
- Waste products management.
Job opportunities available immediately and in the future

- Reception labs / inlets of dairy industry.
- In process testing of dairy products
- Operation department in dairy industry
- Commercial dairy farms
- In collection, distribution and supply chain of dairy sector
- Team member in quality systems (ISO, HACCP)

Curriculum Salient Points

Name of Course: Dairy Technician
Entry level: Middle preferably Matric / Illiterate with minimum 03 years dairy experience
Duration of course: 6-months
Total Training Hours: 790 hours
Training Hours Per week: 40 hours
- 7 hours per day
- 5 hours Friday
Medium of Instruction: English/Urdu
## Overview about the program – Curriculum for Dairy Technician

<table>
<thead>
<tr>
<th>Module Title and Aim</th>
<th>Learning Units</th>
<th>Theory Days/hours</th>
<th>Workplace Days/hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Module 1: Fundamental of Dairy Technology/Industry</strong></td>
<td>LU1 –Dairy Technology</td>
<td>6-hours</td>
<td>0-hours</td>
</tr>
<tr>
<td>Aim: Prepare students with a fair concept of dairy technology, milk constituents. Trainees will also achieve the skills of recognize dairy breeds and moral codes.</td>
<td>LU2 –Milk Composition &amp; Nutrition</td>
<td>6-hours</td>
<td>0-hours</td>
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<td></td>
<td>LU3-Dairy Farming</td>
<td>6-hours</td>
<td>60-hours</td>
</tr>
<tr>
<td></td>
<td>LU4-Work Ethics</td>
<td>6-hours</td>
<td>15-hours</td>
</tr>
<tr>
<td><strong>Module 2: Milk Handling, Collection and Transportation</strong></td>
<td>LU1- Milk Procurement &amp; Collection system</td>
<td>12-hours</td>
<td>30-hours</td>
</tr>
<tr>
<td>Aim: This module will enable the students to have skills of milk procurement, handling, storage and logistics.</td>
<td>LU2- Milk Handling</td>
<td>12-hours</td>
<td>30-hours</td>
</tr>
<tr>
<td></td>
<td>LU3-Milk Storage</td>
<td>6-hours</td>
<td>15-hours</td>
</tr>
<tr>
<td></td>
<td>LU4-Transportation</td>
<td>6-hours</td>
<td>0-hours</td>
</tr>
<tr>
<td><strong>Module 3: Milk Processing &amp; Preservation</strong></td>
<td>LU1- Standardization, Separation, Homogenization</td>
<td>6-hours</td>
<td>42-hours</td>
</tr>
<tr>
<td>Aim: This module will impart the knowledge of milk preservation and prepare the trainee to perform common dairy processes.</td>
<td>LU2- Pasteurization</td>
<td>6-hours</td>
<td>42-hours</td>
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<td></td>
<td>LU3-UHT Plant</td>
<td>6-hours</td>
<td>42-hours</td>
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<td>LU4-Dried Milk Plant</td>
<td>6-hours</td>
<td>30-hours</td>
</tr>
<tr>
<td>Module 4: Milk Products</td>
<td>LU1-Liquid Milk Processing</td>
<td>6-hours</td>
<td>42-hours</td>
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<tr>
<td></td>
<td>LU2-Yougurt and Cheese Processing</td>
<td>6-hours</td>
<td>42-hours</td>
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<td></td>
<td>LU3-Butter and butter oil Processing</td>
<td>6-hours</td>
<td>30-hours</td>
</tr>
<tr>
<td></td>
<td>LU4-Cream and Ice cream Processing</td>
<td>6-hours</td>
<td>30-hours</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module 5: Quality Assurance</th>
<th>LU1- Milk Reception</th>
<th>6-hours</th>
<th>48-hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LU2- Bio- Security</td>
<td>6-hours</td>
<td>0-hours</td>
</tr>
<tr>
<td></td>
<td>LU3-Microbiology of Milk</td>
<td>6-hours</td>
<td>48-hours</td>
</tr>
<tr>
<td></td>
<td>LU4- Quality Systems</td>
<td>15-hours</td>
<td>0-hours</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module 6: Packaging, By- Products /Waste Management</th>
<th>LU1- Packaging of Milk &amp; Milk Products</th>
<th>6-hours</th>
<th>30-hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LU2- Whey</td>
<td>6-hours</td>
<td>30-hours</td>
</tr>
<tr>
<td></td>
<td>LU3-Waste Management</td>
<td>10-hours</td>
<td>15-hours</td>
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<tr>
<td></td>
<td>LU4-Envoirnment Protection</td>
<td>6-hours</td>
<td>0- hours</td>
</tr>
</tbody>
</table>
Dairy Technician Curriculum Contents (Teaching and Learning Guide)

Module 1 Title: Fundamental of Dairy Technology/Industry

Objective of the Module: Prepare students with a fair concept of dairy technology, milk constituents. Trainees will also achieve the skills of recognize dairy breeds and moral codes.

Duration: 99 hours  Theory: 24 hours  Practice: 75 hours

<table>
<thead>
<tr>
<th>Learning Unit</th>
<th>Learning Outcomes</th>
<th>Learning Elements</th>
<th>Duration</th>
<th>Materials Required</th>
<th>Learning Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>LU1-DAIRY TECHNOLOGY</td>
<td>Familiarize the concept of dairy science and technology</td>
<td>Students will be able to: i) Know the definition of milk ii) Know about dairy industry and its scope. iii) Understand the significance of dairy science.</td>
<td>Th. 6-hrs Pr. 0-hrs</td>
<td>Instructional material</td>
<td>Class Room</td>
</tr>
<tr>
<td>LU2- MILK COMPOSITION &amp; NUTRITION</td>
<td>Develop the concept of milk constituents and their functions.</td>
<td>Students will be able to: i) Develop the concept of milk constituents and interactions. ii) understanding of physico chemical properties of milk iii) Understand the role of milk in human nutrition.</td>
<td>Th.6-hrs Pr. 0-hrs</td>
<td>Instructional material</td>
<td>Class Room</td>
</tr>
<tr>
<td>LU3 - DAIRY FARMING</td>
<td>Perform operations related to dairy farming</td>
<td>Students will be able to: i) know the factors effect the quality of milk ii) Identify the common dairy breeds iii) Understanding of hygienic practices involved in dairy farming. iv)perform the hygienic milking operation.</td>
<td>Th. 6-hrs Pr. 60-hrs</td>
<td>Visit to dairy farm</td>
<td>Dairy Farm</td>
</tr>
<tr>
<td>LU4-A WORK ETHICS</td>
<td>To enhance the moral values.</td>
<td>Students will be able to: i) Enhance the moral values as a worker. ii) Perform best under all circumstances according to rules.</td>
<td>Th. 6-hrs Pr. 15-hrs</td>
<td>Instructional material</td>
<td>Class room</td>
</tr>
</tbody>
</table>
**Module 2 Title:** Handling, Collection and Transportation  
**Objective of the Module:** This module will enable the students to have skills of milk procurement, handling, storage and logistics.  
**Duration:** 111 hours  
**Theory:** 36 hours  
**Practice:** 75 hours

<table>
<thead>
<tr>
<th>Learning Unit</th>
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<th>Materials Required</th>
<th>Learning Place</th>
</tr>
</thead>
</table>
| LU1- MILK PROCUREMENT AND COLLECTION SYSTEM | Purchasing and testing of milk. | Students will be able to:  
  i) Know the purchase process  
  ii) Understanding of raw milk market.  
  iii) Perform the collection and preservation of raw milk. | Th. 12-hrs Pr. 30-hrs | H2O2, NaOH, H2SO4, IsoAmyl Alcohol, Ethanol, methyleneblue | Laboratory |
| LU2- MILK HANDLING | Perform precautionary measures to reduce the losses. | Students will be able to:  
  i) Know the precautionary measures for milk handling  
  ii) Perform hygienic handling of milk.  
  iii) CIP of utensils and equipment.  
  iv) line tracing skill | Th. 12-hrs Pr. 30-hrs | Milk, instructional material | Laboratory |
| LU3-MILK STORAGE | Cold chain storage operations | Student will be able to:  
  i) know the storage conditions  
  ii) control the milk chillers and cooling tanks  
  iii) handle the transfer of milk within the plant  
  iv) monitor the quality of milk during storage. | Th. 6-hrs Pr. 15-hrs | Industrial visit | Industry |
| LU4- TRANSPORTATION | Maintain the quality transfer of milk | Student will be able to:  
  i) Perform inspection of milk tanker.  
  ii) Perform CIP of milk tanker and allied accessories.  
  iii) Sealing of tankers before dispatch.  
  iv) dispatch documentation. | Th. 6-hrs Pr. 0-hrs | Industrial visit | Industry |
The tools, equipment and machinery for this module may include:

LU1-Gerber machine, lactometer, Ph meter, refractometer, Petri dishes, test tubes, measuring cylinders, beakers, sampler
LU2- cooling tank, water bath, plunger
Module 3 Title: Processing & Preservation

Objective of the Module: This module will impart the knowledge of milk preservation and prepare the trainee to perform common dairy processes.

**Duration:** 180 hours  **Theory:** 24 hours  **Practice:** 156 hours

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<tr>
<th>Learning Unit</th>
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<th>Learning Elements</th>
<th>Duration</th>
<th>Materials Required</th>
<th>Learning Place</th>
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</thead>
</table>
| LU1 - STANDARDIZATION, SEPERATION, HOMOGENIZATION. | Command to standardized the milk for further processing | Students will be able to:  
   i) Work on milk separator.  
   ii) work on milk homogenizer  
   iii) standardization of milk | Th. 6-hrs  
Pr. 42-hrs | Milk | laboratory |
| LU2 - PASTEURIZATION | Working of pasteurizer | Students will be able to:  
   i) Know the Objective of pasteurization & sterilization  
   ii) know the working of pasteurizer  
   iii) operate the heat exchanger. | Th.6-hrs  
Pr. 42-hrs | Milk | laboratory |
| LU3 - UHT PLANT | Operation of UHT machine | Student will be able to:  
   i) Know the concept of heat transfer.  
   ii) know the working of UHT plant  
   iii) Understand the types of sterilizers.  
   iv) Understand the difference between pasteurization and sterilization. | Th.6-hrs  
Pr.42-hrs | Industrial visit | Industry |
| LU4 - DRIED MILK PLANT | Working of milk drier | Student will be able to:  
   i) understand the concept of drying  
   ii) Understand the working of different types of driers.  
   iii) understand the working of evaporator | Th.6-hrs  
Pr.30-hrs | Milk/condense milk | Laboratory |

The tools, equipment and machinery for this module may include:-

- LU1- cream separator, milk homogenizer.
- LU2- heat exchanger
- LU3- Spray drier, Drum drier
**Module 4 Title:** Milk Products  
**Objective of the Module:** Trainees will attain the comprehensive knowledge and skills of manufacturing different dairy products  
**Duration:** 168 hours  
   **Theory:** 24 hours  
   **Practice:** 144 hours

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<tr>
<th>Learning Unit</th>
<th>Learning Outcomes</th>
<th>Learning Elements</th>
<th>Duration</th>
<th>Materials Required</th>
<th>Learning Place</th>
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</thead>
<tbody>
<tr>
<td>LU1- LIQUID MILK</td>
<td>Manufacturing of processed market milk</td>
<td>Students will be able to:</td>
<td>Th. 6-hrs</td>
<td>Industrial visit</td>
<td>Industry</td>
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<tr>
<td>PROCESSING</td>
<td></td>
<td>i) Know the unit operations in liquid milk processing</td>
<td>Pr. 42-hrs</td>
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<td>ii) Understand the use of tools and equipment.</td>
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<td>iii) Perform in process testing.</td>
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<td>LU2- YOGURT &amp; CHEESE</td>
<td>Manufacturing of yogurt &amp; cheese</td>
<td>Students will be able to:</td>
<td>Th. 6-hrs</td>
<td>Milk, culture, rennet, CaCl2, CMC, Gellitin, sucrose</td>
<td>Laboratory</td>
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<td>i) Know the concept of fermentation.</td>
<td>Pr. 42-hrs</td>
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<td>ii) Perform unit operation involved in yogurt &amp; cheese.</td>
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<td>iii) Perform in process testing.</td>
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<td>iv) Understand the concept of ripening in cheese.</td>
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<tr>
<td>LU3- BUTTER &amp; BUTTER OIL</td>
<td>Manufacturing of butter &amp; butter oil.</td>
<td>Students will be able to:</td>
<td>Th.6 hrs</td>
<td>Cream, culture, salt, color, antioxidant</td>
<td>Laboratory</td>
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<td>i) Know the manufacturing of butter and butter oil.</td>
<td>Pr. 30-hrs</td>
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<td>ii) Know the difference between oil &amp; fat.</td>
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<td>iii) In process testing.</td>
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<tr>
<td>LU4- CREAM &amp; ICE CREAM</td>
<td>Manufacturing of cream &amp; ice cream</td>
<td>Student will be able to:</td>
<td>Th.6 hrs</td>
<td>Milk, color, flavor, nuts, thickeners, Preservatives, sweetners</td>
<td>Laboratory</td>
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<tr>
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<td></td>
<td>i) Manufacturing of cream and ice cream.</td>
<td>Pr. 30-hrs</td>
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<td>ii) understand the storage conditions</td>
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<td></td>
<td>iii) In process testing.</td>
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</table>

**The tools, equipment and machinery for this unit may include:-**

- LU2- Auto clave, refrigerator, incubator, cheese making vat with accessories
- LU3- electric churning machine, bowls, cooker
- LU4- Seperator, wipping machine, mixer, ice cream making machine.
Module 5 Title: Quality Assurance

Objective of the Module: This module will impart the complete knowledge of quality systems and enable trainees to perform quality control testing.

Duration: 129 hours   Theory: 33 hours   Practice: 96 hours

<table>
<thead>
<tr>
<th>Learning Unit</th>
<th>Learning Outcomes</th>
<th>Learning Elements</th>
<th>Duration</th>
<th>Materials Required</th>
<th>Learning Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>LU1- MILK RECEPTION</td>
<td>Perform the organoleptic, analytical and adulteration test.</td>
<td>Students will be able to: i) Perform the organoleptic testing. ii) analysis of milk. iii) perform adulteration testing</td>
<td>Th. 6-hrs Pr. 48-hrs</td>
<td>H2O2,NaOH,H2SO4,IsoAmyl Alcohol,Ethanol,methyleneblue</td>
<td>laboratory</td>
</tr>
<tr>
<td>LU2- BIO-SECURITY</td>
<td>Able to manage the personal and product security.</td>
<td>Students will be able to: i) Understand the concept of physical security ii) Understand the concept of personal security iii) Understand the material control &amp; accountability iv) Understand the transport security.</td>
<td>Th. 6-hrs Pr. 0-hrs</td>
<td>Instructional material</td>
<td>Class room</td>
</tr>
<tr>
<td>LU3- MICROBIOLOGY OF MILK</td>
<td>Perform microbiological tests</td>
<td>Student will be able to: i) Identify the microorganisms involved in milk and milk products. ii)understand the concept of food poisoning iii) Testing of total plate count and coliform in milk &amp; milk products.</td>
<td>Th. 6 hrs Pr.48 hrs</td>
<td>Agar,petri plates, media,</td>
<td>laboratory</td>
</tr>
<tr>
<td>LU4-QUALITY SYSTEMS</td>
<td>Awareness of quality systems</td>
<td>Students will be able to i) know the concept of quality assurance ii)understanding of ISO,HACCP &amp; GMPs.</td>
<td>Th.15 hrs Pr.0 hrs</td>
<td>Instructional material</td>
<td>Class room</td>
</tr>
</tbody>
</table>

The tools, equipment and machinery for this unit may include: -

LU1- Ph meter, lactometer, refractometer, gerber machine, water bath, test tubes, Petri plates,beakers,cylinders,SS cans, butyro meter, test tube racks, sodium meter, automatic pippettors,dispensors, 
LU3- microscopes, incubator, autoclave, Petri plates, wireloops ,laminar flow hood.
**Module 6 Title:** Packaging, By Products and waste management

**Objective of the Module:** This module will impart the knowledge & skills about packaging of dairy products, By products processing & waste Management.

**Duration:** 103 hours  
**Theory:** 28 hours  
**Practice:** 75 hours

<table>
<thead>
<tr>
<th>Learning Unit</th>
<th>Learning Outcomes</th>
<th>Learning Elements</th>
<th>Duration</th>
<th>Materials Required</th>
<th>Learning Place</th>
</tr>
</thead>
</table>
| LU1- PACKAGING OF MILK & MILK PRODUCTS | Identify the nature an Function of different packaging material for dairy products. | Students will be able to:  
i) Understand the characteristics of packaging material.  
ii) know the types of packaging material  
iii)perform the packaging of milk and milk products. | Th. 6-hrs  
Pr. 30-hrs | Different dairy packs and packaging. | Laboratory |
| LU2- WHEY | Efficient uses of whey. | Students will be able to  
i) Understand the importance of by products.  
ii)Perform the hygienic separation of whey  
iii) Know the uses of whey. | Th.6-hrs  
Pr.30-hrs | Visit to dairy industry | Industry |
| LU3- WASTE MANAGEMENT | Learn the Disposal method of waste material | Students will be able to  
i) understand the importance of waste management  
ii)understand the types of whey products.  
iii)understand the disposal procedures | Th .10-hrs  
Pr. 15-hrs | Visit to dairy industry | Industry |
| LU4- ENVOIRNMENT PROTECTION | Understand the importance of environment safety. | Student will be able to  
i) know the concept of environmental pollution  
ii) Understand the types of pollution.  
iii)understand the control of environmental pollution. | Th.6-hrs  
Pr. 0-hrs | Instructional material | Class room |

The tools, equipment and machinery for this unit may include:-

LU1- screw guage, electronic balance
## Assessment

### Module 1: Fundamental of Dairy Technology/Industry

<table>
<thead>
<tr>
<th>Learning Units</th>
<th>Theory hours</th>
<th>Workplace hours</th>
<th>Recommended formative assessment</th>
<th>Recommended Methodology</th>
<th>Scheduled Dates</th>
</tr>
</thead>
</table>
| LU1- DAIRY TECHNOLOGY           | 6 hrs        | 0 hrs           | i) Know the definition of milk  
ii) Know about dairy industry and its scope.  
iii) Understand the significance of dairy science. | i) Oral questioning  
ii) Short Q/A  
iii) Short Q/A |                 |
| LU2- MILK COMPOSITION & NUTRITION | 6 hrs        | 0 hrs           | i) Develop the concept of milk constituents and interactions.  
ii) understanding of physico chemical properties of milk  
iii) Understand the role of milk in human nutrition. | i) Oral questioning  
ii) Demonstration  
iii) Short Q/A |                 |
| LU3- DAIRY FARMING              | 6 hrs        | 60hrs           | i) know the factors effect the quality of milk  
ii) Identify the common dairy breeds  
iii) Understanding of hygienic practices involved in dairy farming.  
iv)perform the hygienic milking operation. | i) Oral questioning  
ii) Demonstration  
iii) Demonstration  
iv) Short Q/A |                 |
| LU4- WORK ETHICS                | 6 hrs        | 15 hrs          | i) Enhance the moral values as a worker.  
ii) Perform best under all circumstances according to rules. | i) Oral questioning  
ii) Short Q/A |                 |

### Critical aspects:-

- History and future prospect of dairy
- Milk composition
- Dairy farm management skills
## Module 2: Handling, Collection and Transportation

<table>
<thead>
<tr>
<th>Learning Units</th>
<th>Theory hours</th>
<th>Workplace hours</th>
<th>Recommended formative assessment</th>
<th>Recommended Methodology</th>
<th>Scheduled Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>LU1- MILK PROCUREMENT AND COLLECTION</td>
<td>12 hrs</td>
<td>30 hrs</td>
<td>i) Know the purchase procedures ii) Understanding of raw milk market. iii) Perform the collection and preservation of raw milk.</td>
<td>i) Oral questioning ii) Short Q &amp; A iii) Demonstration</td>
<td></td>
</tr>
<tr>
<td>LU2- MILK HANDLING</td>
<td>12 hrs</td>
<td>30 hrs</td>
<td>i) Know the precautionary measures for milk handling ii) Perform hygienic handling of milk. iii) CIP of utensils and equipment. iv) line tracing skill</td>
<td>i) Oral questioning ii) Demonstration iii) Short Q &amp; A iv) Demonstration</td>
<td></td>
</tr>
<tr>
<td>LU3-MILK STORAGE</td>
<td>6 hrs</td>
<td>15 hrs</td>
<td>i) know the storage conditions ii) control the milk chillers and cooling tanks iii) handle the transfer of milk within the plant iv) monitor the quality of milk during storage.</td>
<td>i) Oral questioning ii) Short Q/A iii) Demonstration iv) Demonstration</td>
<td></td>
</tr>
<tr>
<td>LU4-TRANSPORTATION</td>
<td>6 hrs</td>
<td>0 hrs</td>
<td>i) Perform inspection of milk tanker. ii) Perform CIP .of milk tanker and allied accessories. iii) Sealing of tankers before dispatch. iv) dispatch documentation.</td>
<td>i) Demonstration ii)oral questioning iii)Short Q/A iv)oral questioning</td>
<td></td>
</tr>
</tbody>
</table>

The tools, equipment and machinery for this module may include:-
- LU1-Gerber machine, lactometer, Ph meter, refracto meter, Petri dishes, test tubes, measuring cylinders, beakers, sampler
- LU2- cooling tank, water bath, plunger

**Critical aspects:-**
- basic milk test
- milk handling & storage
- milk logistic procedures
# Module 3: Processing & Preservation

<table>
<thead>
<tr>
<th>Learning Units</th>
<th>Theory hours</th>
<th>Workplace hours</th>
<th>Recommended formative assessment</th>
<th>Recommended Methodology</th>
<th>Scheduled Dates</th>
</tr>
</thead>
</table>
| LU1-STANDARDIZATION, SEPARATION, HOMOGENIZATION | 6 hrs        | 42 hrs         | i) Work on milk separator.  
ii) work on milk homogenizer  
iii) standardization of milk                                                               | i) Oral questioning  
ii) Short Q & A  
iii) Demonstration                                   |                 |
| LU2-PASTEURIZATION                       | 6 hrs        | 42 hrs         | i) Know the Objective of pasteurization& sterilization  
ii) know the working of pasteurizer  
iii) Operate the heat exchanger.                                                          | i) Oral questioning  
ii) Demonstration  
iii) Short Q & A                                    |                 |
| LU3-UHT                                 | 6 hrs        | 42 hrs         | i) Know the concept of heat transfer.  
ii) know the working of UHT plant  
iii) Understand the types of sterilizers.  
iv) Understand the difference between pasteurization and sterilization. | i) Oral questioning  
ii) Demonstration  
iii) Short Q & A  
iv) Short Q/A                                         |                 |
| LU4-DRIED MILK PLANT                     | 6 hrs        | 30 hrs         | i) understand the concept of drying  
ii) Understand the working of different types of driers.  
iii) understand the working of evaporator                                                  | i) Oral questioning  
ii) Demonstration  
iii) Short Q & A                                    |                 |

The tools, equipment and machinery for this module may include:

- LU1- cream separator, milk homogenizer.  
- LU2- heat exchanger  
- LU3- Spray drier, Drum drier  
- LU4- Dried milk plant

**Critical aspects:**

- standardization and homogenization practice  
- pasteurization technique  
- milk drying technique
**Module 4: Milk Products**

<table>
<thead>
<tr>
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</table>
| LU1- LIQUID MILK PROCESSING | 6 hrs | 42 hrs | i) Know the unit operations in liquid milk processing  
ii) Understand the use of tools and equipment.  
iii) Perform in process testing. | i) Oral questioning  
ii) Short Q & A  
iii) Demonstration |                   |
| LU2- YOGHURT, CHEESE PROCESSING | 6 hrs | 42 hrs | i) Know the concept of fermentation.  
ii) Perform unit operation involved in yogurt & cheese.  
iii) perform In process testing  
iv) Understand the concept of ripening in cheese. | i) Oral questioning  
ii) Demonstration  
iii) Short Q/A |                   |
| LU3- BUTTER, BUTTER OIL PROCESSING | 6 hrs | 30 hrs | i) Know the manufacturing of butter and butter oil.  
ii) Know the difference between oil & fat.  
iii) in process testing | i) Oral questioning  
ii) Demonstration  
iii) Short Q/A |                   |
| LU4- CREAM, ICE CREAM PROCESSING | 6 hrs | 30 hrs | i) Manufacturing of cream and ice cream.  
ii) understand the storage conditions  
iii) In process testing. | i) Oral questioning  
ii) Demonstration  
iii) Short Q/A |                   |

The tools, equipment and machinery for this module may include:-

- LU2- Auto clave, refrigerator, incubator, cheese making vat with accessories
- LU3- electric churning machine, bowls, cooker
- LU4- Separator, wiping machine, mixer, ice cream making machine.

**Critical aspects:-**

- processing of different commodities
- quality maintenance of dairy products
## Module 5: Quality Assurance

<table>
<thead>
<tr>
<th>Learning Units</th>
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<tbody>
<tr>
<td>LU1- MILK RECEPTION</td>
<td>6 hrs</td>
<td>48 hrs</td>
<td>ii) Perform the organoleptic testing. i) analysis of milk. iii) perform adulteration testing</td>
<td>i) Oral questioning ii) Short Q &amp; A iii) Demonstration</td>
<td></td>
</tr>
<tr>
<td>LU2- BIO SECURITY</td>
<td>6 hrs</td>
<td>0 hrs</td>
<td>ii) Understand the concept of physical security i) Understand the concept of personal security ii) Understand the material control &amp; accountability iii) Understand the transport security.</td>
<td>ii) Oral questioning i) Oral questioning ii) Short Q &amp; A iii) Short Q/A</td>
<td></td>
</tr>
<tr>
<td>LU3- MICROBIOLOGY OF MILK</td>
<td>6 hrs</td>
<td>48 hrs</td>
<td>i) Identify the micro organisms involved in milk and milk products. ii) understand the concept of food poisoning iii) Testing of total plate count and coli form in milk &amp; milk products.</td>
<td>i) Oral questioning ii) Short Q &amp; A iii) Demonstration</td>
<td></td>
</tr>
<tr>
<td>LU4- QUALITY SYSTEMS</td>
<td>15 hrs</td>
<td>0 hrs</td>
<td>i) know the concept of quality assurance ii) understanding of ISO, HACCP &amp; GMPs.</td>
<td>i) Oral questioning ii) Short Q &amp; A</td>
<td></td>
</tr>
</tbody>
</table>

The tools, equipment and machinery for this module may include:-
- LU1- Ph meter, lactometer, refractometer, gerber machine, water bath, test tubes, Petri plates, beakers, cylinders, SS cans, butyro meter, test tube racks, sodium meter, automatic pippettors, dispensers,
- LU3- microscopes, incubator, autoclave, Petri plates, wire loops, laminar flow hood.

Critical aspects:-
- complete milk testing
- personal hygiene
- implementation of quality systems
Module 6: Packaging, By Products,& Waste Management

<table>
<thead>
<tr>
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<th>Theory hours</th>
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</table>
| LU1- PACKAGING OF MILK AND MILK PRODUCTS | 6 hrs | 30 hrs | i) Understand the characteristics of packaging material.  
ii) know the types of packaging material  
iii) perform the packaging of milk and milk products. | i) Oral questioning  
ii) Short Q & A  
iii) Demonstration | |
| LU2- WHEY | 6 hrs | 30 hrs | i) Understand the importance of by products.  
ii) Perform the hygienic separation of whey  
iii) Know the uses of whey. | i) Short Q & A  
ii) Oral questioning  
iii) Short Q & A | |
| LU3-WASTE MANAGEMENT | 10 hrs | 15 hrs | i) understand the importance of waste management  
ii) understand the types of whey products.  
iii) understand the disposal procedures | i) Short Q & A  
ii) Oral questioning  
iii) Short Q & A | |
| LU4- ENVOIRNMENT PROTECTION | 6 hrs | 0 hrs | i) know the concept of environmental pollution  
ii) Understand the types of pollution.  
iii) Understand the control of environmental pollution. | i) Short Q & A  
ii) Oral questioning  
iii) Short Q & A | |

The tools, equipment and machinery for this module may include:-

LU1- screw gauge, electronic balance

Critical aspects:-

- packaging of dairy products
- whey separation and uses
- waste disposal
Supportive notes

The candidate will be required to:

- Orally, or by other methods of communications, answer the questions asked by the assessor.
- Identify superiors who can be approached for the collection of competency evidence.
- Present evidence related to the units.

During assessment the candidate will:

- Demonstrate safe work practices at all times.
- Communicate information about processes, events or tasks being undertaken to ensure a safe and efficient working environment.
- Take the responsibility for the quality of his/her own work.
- Plan task and review task requirements at appropriate time.
- Relate to all stakeholders according to accepted conventions.
- Perform all tasks in accordance with standard operating procedures.
- Perform all tasks to specifications.
- Use accepted data collection techniques, practices, and processes in line with workplace procedures.

**Resources required for assessment include:**

All material, tools, equipment and machinery listed within the modules.